**Science Standards Fourth Grade**

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| **Embedded Inquiry**  **GLE 0407.Inq.1** Explore different scientific phenomena by asking questions, making logical predictions, planning investigations, and recording data.  **GLE 0407.Inq.2** Select and use appropriate tools and simple equipment to conduct an investigation.  **GLE 0407.Inq.3** Organize data into appropriate tables, graphs, drawings, or diagrams.  **GLE 0407.Inq.4** Identify and interpret simple patterns of evidence to communicate the findings of multiple investigations.  **GLE 0407.Inq.5** Recognize that people may interpret the same results in different ways.  **GLE 0407.Inq.6** Compare the results of an investigation with what scientists already accept about this question. | | |
| **Checks for Understanding** | | **State Performance Indicators** |
| **✓0407.Inq.1** Identify specific investigations that could be used to answer a particular question and identify reasons for this choice.  **✓0407.Inq.2** Identify tools needed to investigate specific questions.  **✓0407.Inq.3** Maintain a science notebook that includes observations, data, diagrams, and explanations.  **✓0407.Inq.4** Analyze and communicate findings from multiple investigations of similar phenomena to reach a conclusion. | | **SPI 0407.Inq.1** Select an investigation that could be used to answer a specific question. |
| **Embedded Technology & Engineering**  **GLE 0407.T/E.1** Describe how tools, technology, and inventions help to answer questions and solve problems.  **GLE 0407.T/E.2** Recognize that new tools, technology, and inventions are always being developed.  **GLE 0407.T/E.3** Identify appropriate materials, tools, and machines that can extend or enhance the ability to solve a specified problem.  **GLE 0407.T/E.4** Recognize the connection between scientific advances, new knowledge, and the availability of new tools and technologies.  **GLE 0407.T/E.5** Apply a creative design strategy to solve a particular problem generated by societal needs and wants. | | |
| **✓0407.T/E.1** Explain how different inventions and technologies impact people and other living organisms.  **✓0407.T/E.2** Design a tool or a process that addresses an identified problem caused by human activity.  **✓0407.T/E.3** Determine criteria to evaluate the effectiveness of a solution to a specified problem.  **✓0407.T/E.4** Evaluate an invention that solves a problem and determine ways to improve the design. | | **SPI 0407.T/E.1** Select a tool, technology, or invention that was used to solve a human problem.  **SPI 0407.T/E.2** Recognize the connection between a scientific advance and the development of a new tool or technology. |
| **Standard 1: Cells**  **GLE 0407.1.1** Recognize that cells are the building blocks of all living things. | | |
| **✓0407.1.1** Use illustrations or direct observations to compare and contrast the basic structures of plant and animal cells.  **✓0407.1.2** Create a basic model of the cell that illustrates different cell structures and describes their functions. | | **SPI 0407.1.1** Compare basic structures of plant and animal cells. |
| **Standard 2: Interdependence**  **GLE 0407.2.1** Analyze the effects of changes in the environment on the stability of an ecosystem. | | |
| **✓0407.2.1** Analyze how an increase or decrease in competition or predation affects an ecosystem.  **✓0407.2.2** Design a simple experiment to illustrate the effects of competition, predation, and interdependency among living things. | | **SPI 0407.2.1** Recognize the impact of predation and competition on an ecosystem. |
| **Standard 3: Flow of Matter and Energy**  **GLE 0407.3.1** Demonstrate that plants require light energy to grow and survive.  **GLE 0407.3.2** Investigate different ways that organisms meet their energy needs. | | |
| **✓0407.3.1** Create a food web that illustrates the energy relationships between plants and animals and the key issues or assumptions found in the model.  **✓0407.3.2** Classify organisms as carnivores, herbivores, or omnivores.  **✓0407.3.3** Identify how a variety of organisms meet their energy needs. | | **SPI 0407.3.1** Determine how different organisms function within an environment in terms of their location on an energy pyramid. |
| **Standard 4: Heredity**  **GLE 0407.4.1** Recognize the relationship between reproduction and the continuation of a species.  **GLE 0407.4.2** Differentiate between complete and incomplete metamorphosis. | | |
| **✓0407.4.1** Design a simple demonstration that illustrates the relationship between reproduction and survival of a species.  **✓0407.4.2** Study the life cycles of a variety of organisms and determine whether these processes illustrate complete or incomplete metamorphosis. | | **SPI 0407.4.1** Draw conclusions about the relationship between reproduction and the survival of a species.  **SPI 0407.4.2** Distinguish between complete and incomplete metamorphosis. |
| **Standard 5: Biodiversity and Change**  **GLE 0407.5.1** Analyze physical and behavioral adaptations that enable organisms to survive in their environment.  **GLE 0407.5.2** Describe how environmental changes caused the extinction of various plant and animal species. | | |
| **✓0407.5.1** Classify animals according to their physical adaptations for obtaining food, oxygen, and surviving within a particular environment.  **✓0407.5.2** Describe how animal behaviors such as migration, defense, means of locomotion, and hibernation enable them to survive in an environment.  **✓0407.5.3** Investigate tropisms that plants exhibit in response to changes in their environment.  **✓0407.5.4** Gather fossil information to draw conclusions about organisms that exist today.  **✓0407.5.5** Analyze the common causes of extinction and explain how human actions sometimes result in the extinction of a species. | | **SPI 0407.5.1** Determine how a physical or behavioral adaptation can enhance the chances of survival.  **SPI 0407.5.2** Infer the possible reasons why a species became endangered or extinct. |
| **Standard 6: The Universe**  **GLE 0407.6.1** Analyze patterns, relative movements, and relationships among the sun, moon, and earth. | | |
| **✓0407.6.1** Chart the movements of the sun, moon, and earth to develop an explanation for the phases of the moon and solar and lunar eclipses.  **✓0407.6.2** Sequence the major phases of the moon during a lunar cycle. | **SPI 0407.6.1** Organize the phases of the moon in the correct sequence.  **SPI 0407.6.2** Infer that the moon’s phases are caused by the revolution of the moon and earth around the sun. | |
| **Standard 7: The Earth**  **GLE 0407.7.1** Investigate how the Earth’s geological features change as a result of erosion (weathering and transportation) and deposition.  **GLE 0407.7.2** Evaluate how some earth materials can be used to solve human problems and enhance the quality of life. | | |
| **✓0407.7.1** Prepare a demonstration to illustrate how wind and water affect the earth’s surface features.  **✓0407.7.2** Design an investigation to demonstrate how erosion and deposition change the earth’s surface.  **✓0407.7.3** List factors that determine the appropriate use of an earth material.  **✓0407.7.4** Use data from a variety of informational texts to analyze and evaluate man’s impact on non-renewable resources. | **SPI 0407.7.1** Design a simple model to illustrate how the wind and movement of water alter the earth’s surface.  **SPI 0407.7.2** Analyze how different earth materials are utilized to solve human problems or improve the quality of life. | |
| **Standard 8: The Atmosphere**  **GLE 0407.8.1** Recognize the major components of the water cycle.  **GLE 0407.8.2** Differentiate between weather and climate. | | |
| **✓0407.8.1** Prepare a model that illustrates the basic features of the water cycle.  **✓0407.8.2** Use long-term weather data to distinguish between weather and climate.  **✓0407.8.3** Use an illustration to predict and draw conclusions about how weather and climate affect the water cycle. | **SPI 0407.8.1** Identify the basic features of the water cycle and describe their importance to life on earth.  **SPI 0407.8.2** Distinguish between weather and climate. | |
| **Standard 9: Matter**  **GLE 0407.9.1** Collect data to illustrate that the physical properties of matter can be described with tools that measure weight, mass, length, and volume.  **GLE 0407.9.2** Explore different types of physical changes in matter. | | |
| **✓0407.9.1** Use appropriate tools to measure and compare the physical properties of various solids and liquids.  **✓0407.9.2** Compare the causes and effects of various physical changes in matter. | **SPI 0407.9.1** Choose an appropriate tool for measuring a specific physical property of matter.  **SPI 0407.9.2** Determine the mass, volume, and temperature of a substance or object using proper units of measurement.  **SPI 0407.9.3** Interpret the causes and effects of a physical change in matter. | |
| **Standard 10: Energy**  **GLE 0407.10.1** Distinguish among heat, radiant, and chemical forms of energy.  **GLE 0407.10.2** Investigate how light travels and is influenced by different types of materials and surfaces. | | |
| **✓0407.10.1** Design an investigation to demonstrate how different forms of energy release heat or light.  **✓0407.10.2** Design an experiment to investigate how different surfaces determine if light is reflected, refracted, or absorbed.  **✓0407.10.3** Gather and organize information about a variety of materials to categorize them as translucent, transparent, or opaque. | **SPI 0407.10.1** Identify different forms of energy, such as heat, light, and chemical.  **SPI 0407.10.2** Determine which surfaces reflect, refract, or absorb light.  **SPI 0407.10.3** Determine whether a material is transparent, translucent, or opaque. | |
| **Standard 11: Motion**  **GLE 0407.11.1** Recognize that the position of an object can be described relative to other objects or a background.  **GLE 0407.11.2** Design a simple investigation to demonstrate how friction affects the movement of an object.  **GLE 0407.11.3** Investigate the relationship between the speed of an object and the distance traveled during a certain time period. | | |
| **✓0407.11.1** Identify the position of objects relative to fixed reference points.  **✓0407.11.2** Design an investigation to identify factors that affect the speed and distance traveled by an object in motion.  **✓0407.11.3** Complete a coordinate graph to describe the relative positions of objects.  **✓0407.11.4** Plan and execute an investigation that demonstrates how friction affects the movement of an object.  **✓0407.11.5** Design and implement an investigation to determine that the speed of an object is equal to the distance traveled over time. | **SPI 0407.11.1** Describe the position of an object relative to fixed reference points.  **SPI 0407.11.2** Identify factors that influence the motion of an object.  **SPI 0407.11.3** Determine the relationship between speed and distance traveled over time. | |
| **Standard 12: Forces in Nature**  **GLE 0407.12.1** Explore the interactions between magnets.  **GLE 0407.12.2** Observe that electrically charged objects exert a pull on other materials.  **GLE 0407.12.3** Explain how electricity in a simple circuit requires a complete loop through which current can pass. | | |
| **✓0407.12.1** Explore the interactions between an electrically charged object and other materials.  **✓0407.12.2** Design an experiment to investigate how a simple electromagnet affects common objects.  **✓0407.12.3** Describe how electricity passes through a simple circuit that includes a battery, wire, switch, and bulb. | **SPI 0407.12.1** Identify how magnets attract or repel one another.  **SPI 0407.12.2** Determine how anelectrically charged material interacts with other objects.  **SPI 0407.12.3** Determine the path of an electrical current in a simple circuit. | |